

Patent Claims:

1. Closed level control system for vehicles with which a vehicle body is suspended relative to at least one vehicle axle, the closed level control system including the following components:

- pressurized medium chambers (6a-6d)
- 5 - a compressor (8)
- an air dryer (10)
- a pressurized medium supply vessel (12, 13) which is connected to the pressurized medium chambers (6a-6d) via the compressor (8) in such a manner that

- 10 - pressurized medium can be transferred from the pressurized medium supply vessel (12, 13) via the compressor (8) to each pressurized medium chamber (6a-6d) wherein the compressor input (14) is connected to the pressurized medium supply
15 vessel (12, 13) via a first pressurized air line (1) switched through with a directional valve (52a) and the compressor output (14) is connected to the pressurized medium chamber via a second pressurized air line (2) switched through with a directional
20 valve (54a), and
- pressurized medium can be transferred from each of the pressurized medium chambers (6a-6d) via the compressor (8) to the pressurized medium supply
25 vessel (12, 13) wherein the compressor input (14) is connected to the pressurized medium chamber (6a-6d) via a third pressurized air line (3) switched through with a directional valve (54a) and the compressor output (14) is connected to the pressurized medium

supply vessel (12, 13) via a fourth pressurized air
30 line (4) switched through with a directional
valve (52a), wherein

- the air dryer (10) is arranged in the fourth pressurized air
line (4),
- an intake line (5) is present which ends in an intake
35 valve (46) and via which the compressor input (14) can be
connected to the atmosphere,
- a discharge line (2) is present which branches off from the
fourth pressurized air line (4) in a point (27), which lies
between the compressor output (16) and the air dryer (10), and
40 which discharge line (2) ends in a discharge valve (46) so that
the pressurized medium supply vessel (12, 13) can be connected to
the atmosphere via the air dryer (10) and the discharge line (2)
- the level control system has at least two controllable
directional valves (52a, 54a) with each of these valves being
45 able to have at least two switching positions
characterized in that

the pressurized medium supply vessel (12, 13) is partitioned
into a first and a second pressurized medium space (12, 13) which
have no direct connection, and either the first pressure medium
50 space or said second pressure medium space can be connected to
the compressor input or to the compressor output via at least one
common controllable directional valve (52a) so that pressurized
medium from the pressurized medium chambers (6a-6d) can be
transferred into the first or into the second pressurized medium
55 space (12, 13) or pressurized medium from the first or the second
pressurized medium space (12, 13) can be transferred to the
pressurized medium chambers (6a-6d).

2. Closed level control system for vehicles according to claim 1, characterized in that

- the level control system has at least three controllable directional valves (52a, 54a, 56a) each of which can assume at least two switching states, and that
- the first pressurized medium line (1) with the first controllable directional valve (52a) and the second pressurized air line (2) with the second controllable directional valve (54a) are switched through and the fourth pressurized air line (4) with the first controllable directional valve (54a) and the third pressurized air line (3) with the second controllable directional valve (54a) are blocked when pressurized air is to be transferred from one of the pressurized medium spaces (12, 13) into a pressurized medium chamber (6a-6d) wherein the first and the second controllable directional valves (52a, 54a) are in a first switching state, and that
- the third pressurized air line (3) with the second controllable directional valve (54a) and the fourth pressurized air line (4) with the first controllable directional valve (52a) are switched through and the first pressurized air line (1) with the first controllable directional valve (52a) and the second pressurized air line (2) with the second controllable directional valve (54a) are blocked when pressurized air is to be transferred from a pressurized medium chamber (6a-6d) into one of the two pressurized medium spaces (12, 13) wherein the first and second controllable directional valves (52a, 54a) are then in a second switching state,
- wherein a connection is established from the first

controllable directional valve (52a) to the first
pressurized medium space (12) and a connection to the second
pressurized medium space (13) is blocked when the third
directional valve (56a) is in its first switching state, and
35 - wherein a connection is established from the first
controllable directional valve (52a) TO THE Second
pressurized medium space (13) and a connection from the
first pressurized medium space (12) is blocked when the
third directional valve (56a) is in its second switching
40 state.

3. Closed level control system for vehicles according to one or
several of the above claims, characterized in that

- a first check valve lies in the first pressurized air
line (1) between the common point (29) and the first
5 controllable directional valve (52a), with which the first
pressurized air line can be switched through, and the check
valve (31) opening toward the compressor input (14) and that
- a further check valve (33) lies in the third pressurized air
line (3) between the common point (29) and the second
10 controllable directional valve (54a), with which the third
pressurized air line (3) can be switched through, and the
second check valve (33) opening toward the input of the
compressor.

4. Closed level control system for vehicles according to one or
several of the above claims, characterized in that

the two pressurized medium spaces (12, 13) are formed by two
separate pressurized medium supply vessels (12, 13).

5. Closed level control system for vehicles according to one or several of the above claims, characterized in that

the two pressurized medium spaces (12, 13) have different pressure levels.

6. Closed level control system for vehicles according to one or several of the above claims, characterized in that

the pressure in at least one of the two pressurized medium spaces (12, 13) is higher than the maximum actual compression end pressure of the compressor (8).

7. Closed level control system for vehicles according to one or several of the above claims, characterized in that

the pressure in at least one of the two pressurized medium spaces (12, 13) can be utilized for the control of external apparatus (44), especially tire inflating devices, and the residual pressure in the other pressurized medium space (12, 13) being available to execute a level change of the level control system directly after the external control operation.

8. Method for controlling the level of vehicles especially with a closed level control system according to one or several of the above claims 1 to 7, characterized in that

the compressor, when filling the pressurized medium space (12, 13), which has a higher pressure than the actual compression end pressure of the compressor (8), transfers pressurized medium from the pressurized medium chambers (6a-6d) into this pressurized medium space (12, 13).

9. Method for controlling the level of vehicles especially with a closed level control system according to one or several of the above claims 1 to 7,

characterized in that

5 pressurized medium from the air dryer (10) can be transferred sequentially into the first or the second pressurized medium space (12, 13), which has a pressure higher than the actual compression end pressure of the compressor (8) wherein the compressor draws sequentially pressurized medium from the second
10 or the first pressurized medium space, which is not to be filled, and transfers the pressurized medium into the air dryer when the first or the second pressurized medium space (12, 13) is not connected to the air dryer (10) or no pressurized medium is transferred from the air dryer (10) into the first or the second
15 pressurized medium space (12, 13).

Summary

Closed level control system for vehicles with which a vehicle body is suspended relative to at least one vehicle axle. The level control system includes pressurized medium chambers, a compressor, an air dryer and a pressurized medium supply vessel which is partitioned into first and second pressurized medium spaces. The two pressurized medium spaces have no direct connection. Either the first pressurized medium space or the second pressurized medium space can be connected to the compressor input or the compressor output via at least one common controllable directional valve so that the pressurized medium from the pressurized medium chambers can be transferred into the first or into the second pressurized medium space or pressurized medium can be transferred from the first or the second pressurized medium space into the pressurized medium chambers.

FIG. 2